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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,055	11/14/2001	Bruce F. Macbeth	905_132NP	4851

20874 7590 01/23/2004
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EXAMINER

TERESINSKI, JOHN

ART UNIT	PAPER NUMBER
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2858

DATE MAILED: 01/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)	
09/992,055	MACBETH ET AL.	
Examiner	Art Unit	
John Teresinski	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14, 24-43 and 45 is/are rejected.
- 7) ☒ Claim(s) 15-23, 44 and 46-55 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
 a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 4, 7, 11, 13, 26-30, 36, 37, 41 and 42 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,659,453 to Russell et al..

Regarding claims 1, 41 and 42, Russell et al. disclose a method and apparatus including an upstream/downstream discriminator circuit which detects load current fluctuations and line voltage fluctuations (column 4 lines 1-5), detects an upstream even when fluctuations are in phase and detects a downstream transient event when fluctuations are out of phase (column 2 lines 38-47).

Regarding claim 3, Russell et al. disclose transient events that produce a low frequency spectrum (column 9 lines 64-67).

Regarding claim 4, Russell et al. disclose steps in load current are detected with a current transformer (column 4 lines 5-8).

Regarding claim 7, Russell et al. disclose steps in load current produced by steps in line voltage are connected to at least one input of a microprocessor (Fig. 1 elements 30, 34 and 35).

Regarding claims 11 and 36, Russell et al. disclose a first sensor for detecting current fluctuations (column 4 lines 1-5), and a second sensor for detecting voltage fluctuations (column 4 lines 1-5).

Regarding claims 12 and 37, Russell et al. disclose an interrupting mechanism responsive to a signal from the discriminator, wherein the interrupting mechanism does not disconnect the load from the electrical distribution system when the arc fault is located in the remainder of the electrical distribution system (column 7 lines 1-8).

Regarding claims 13 and 28, Russell et al. disclose arc faults occurring in the protected branch portion produce contrary step directions with respect to faults occurring in the remainder of the electrical distribution system (column 7 lines 1-8) and monitoring half cycles of power line frequency (column 2 lines 28-30).

Regarding claims 26 and 29, Russell et al. disclose voltage and current zero cross detectors wherein a phased relationship to determine whether an arc fault is located in the branch or remainder of the electrical distribution system (column 7 lines 31-48).

Regarding claims 27 and 30, Russell et al. disclose the interrupting mechanism does not disconnect the load from the electrical distribution system when arc fault is located in the remainder of the electrical distribution system (column 7 lines 11-16).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 6, 24, 25, 33, 38-40, 43 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Russell et al. in view of U.S. Patent No. 5,439,509 to Blades.

Regarding claims 2, 6, 33, 43 and 45, Russell et al. does not disclose a transient events producing a high frequency spectrum or a high pass filter. Blades discloses a method and apparatus for detecting arcing in power systems and that it is well known to utilize a high pass filters detect steps in line voltage (column 21 lines 18-42). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the high pass filter and microprocessor as taught by Blades into Russell et al. for the purpose of providing a convenient means of acquiring high frequency noise (column 21 lines 18-42).

Regarding claims 24 and 25, Russell et al. does not disclose pre-determined hold times. Blades discloses that it is well known in detecting arcing to utilize a microprocessor to detect steps in line voltage (column 21 lines 18-42) and pre-determined hold times (column 22 lines 40-49). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the high pass filter and microprocessor as taught by Blades into Russell et al. for the purpose of providing a convenient means of acquiring high frequency noise (column 21 lines 18-42).

Regarding claims 38-40, Russell et al. does not disclose current and voltage fluctuations exclusively associated with arc extinguishing or that occur during each half cycle. Blades discloses that it is well known for current and voltage fluctuations to be exclusively associated with arc extinguishing and fluctuations that occur during each half cycle (column 4 lines 44-64). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the limitations as taught by Blades into Russell et al. for the purpose of accurately detection arc faults based on arc characteristics.

Claims 5, 8-10, 31, 32, 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Russell et al. in view of U.S. Patent No. 4,922,368 to Johns.

Regarding claims 5, 31, 32, 34 and 35, Russell et al. does not disclose an impedance in series with a power line. Johns disclose a method and apparatus for detecting faults including detecting steps in load current across an impedance in series with a power line (column 6 lines 27-42). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include an impedance element as taught by Johns into Russell et al. for the purpose of providing an output voltage indicative of current (column 6 lines 35-42).

Regarding claim 8, Russell et al. does not disclose out of phase steps in line voltage and load current produced by upstream line impedance. Johns discloses out of phase steps in line voltage and load current produced by an upstream line impedance (column 11 lines 52-68, column 12 lines 44-56). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include out of phase steps produced by upstream impedance as taught by Johns into Russell et al. for the purpose of establishing the proper direction of a fault.

Regarding claims 9 and 10, Russell et al. does not disclose inherent or introduced line impedance for producing a voltage drop. Johns discloses an inherent (column 5 lines 55-64) and introduced line impedance (column 10 lines 55-64) for producing a voltage drop. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include an inherent and introduced voltage drop as taught by Johns into Russell et al. for the purpose of producing accurate measurements by properly accounting for line characteristics.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Russell et al. in view of U.S. Patent No. 5,572,138 to Nimmersj"o.

Regarding claim 14, Russell et al. does not disclose differentiating sensors. Nimmersj"o discloses a method for determining the direction of a fault including differentiating sensors (column 3 lines 31-37). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include differentiating sensors as taught by Nimmersj"o into Russell et al. for the purpose of accurately determining the location of a fault.

Allowable Subject Matter

Claims 15-23, 44 and 46-55 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance:

Regarding claims 15:

The primary reason for indicating allowable subject matter of claim 14 is the inclusion of di/dt sensor converts steps into di/dt pulses, dv/dt sensor converts steps into dv/dt pulses and identification of the direction from polarities of leading edges of the pulses. It is these features found in the claim, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art. Claims 16-23 are indicated allowable due to their dependency on claim 15.

Regarding claim 44:

The primary reason for indicating allowable subject matter of claim 44 is the inclusion of a range of harmonics from its fundamental frequency to its 10th harmonic. It is these features found in the claim, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

Regarding claims 46:

The primary reason for indicating allowable subject matter of claim 46 is the inclusion of comparing the polarities of the voltage fluctuations and the current fluctuations wherein the comparison indicates whether an arc fault or arc mimicking noise is located in the branch circuit portion or located in a remainder of said electrical distribution system based on the comparison of the polarities. It is these features found in the claim, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

Claims 47-55 are indicated allowable due to their dependency on claim 46.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

Applicant's arguments with respect to claims 1-55 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Teresinski whose telephone number is (703) 305-4746. The examiner can normally be reached on M-F 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le can be reached on (703) 308-0750. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JT

January 13, 2004



N. Le
Supervisory Patent Examiner
Technology Center 2800